

**State of California  
The Resources Agency  
California Department of Fish & Wildlife  
North Central Region**

**Thermalito Afterbay**

**2012 Creel Census and Sport Fish Catch Evaluation Study**



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Scientific Aid

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## **Introduction:**

In 2012, the California Department of Fish & Wildlife (CDFW) conducted a creel census on the Thermalito Afterbay in Butte County. Data was collected from anglers for the purpose of assessing steelhead trout (*Oncorhynchus mykiss*) planting, as well as to evaluate the overall angling experience for the water. Additional data was taken on angler cities of origin, fishing method, tackle used and angler satisfaction. Creel census occurred at the two boat ramps that access the lake. Together the census resulted in 58 interviews and data collected on 74 fish.

Thermalito Afterbay is a multi-use reservoir located about 20 miles south of Chico, CA. It is part of the Oroville-Thermalito complex, operated by the State of California Department of Water Resources. The Afterbay was formed upon completion of the Thermalito Afterbay Dam in 1969. The dam defines the west and south ends of the reservoir and at 42,000 feet, is the longest dam in the California State Water Project system. At maximum operating capacity the water surface sits at 136.5 feet above sea level and covers 4,300 acres. Total shore line at maximum operating capacity is 26 miles and the maximum capacity is 57,040 acre-feet<sup>4</sup>. The Afterbay receives its water from Lake Oroville which is fed by the confluence of the North, Middle and South Forks as well as the West Branch of the Feather river<sup>2</sup>. Thermalito Afterbay functions in several ways to support the Thermalito diversion dam power plant while also providing a variety of recreational possibilities. The Afterbay is also used to regulate downstream flows and as a warming basin for water use by rice farmers to the east of the Oroville complex. Recreational uses include boating, swimming, waterfowl hunting and year around fishing<sup>3</sup>.

Fishing at Thermalito Afterbay is allowed year around and the reservoir has two boat ramps and miles of accessible shore line, making for great fishing access. The majority of anglers (88%) visited the reservoir from nearby communities with the remainder traveling less than two hours (Table 1).

**Table 1. Angler Origin for Thermalito Afterbay (2012)**

<b>City</b>	<b>Angler Count</b>
Oroville, CA	19
Chico, CA	16
Yuba County, CA (Unincorporated)	10
Marysville, CA	6
Live Oak, CA	5
Roseville, CA	1
Rancho Murieta	1

In the 10 years prior to 2012, stocking in the Thermalito Afterbay only occurred in 2007. At that time, 4800 steelhead were stocked. The results were positive as the sub-catchable plants grew rapidly and provided great angling opportunities in the following years<sup>5</sup>. With the increased availability of hatchery steelhead, the CDFW was able to stock Thermalito Afterbay with steelhead again in 2012<sup>5</sup>. Stocking occurred once in 2012 with 5000 steelhead trout (*Oncorhynchus mykiss*) weighing a total of 1515 lbs. In order to assess the success of the stocking program at Thermalito Afterbay, 499 of the planted trout were Floy<sup>®</sup> tagged with \$10.00 reward tags and angler surveys were conducted to determine return rates of fish caught, angler use, and preferences.

Beyond steelhead, there are numerous fish species populating the reservoir. In the past, brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) were stocked into the Afterbay and Forebay and may still be present. Black bass species present are largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), spotted bass (*Micropterus punctulatus*). Other sport fish include black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochyrus*), green sunfish (*Lepomis cyanellus*), redear sunfish (*Lepomis microlofus*), tule perch (*Histerocarpus traski*), brown bullhead (*Ameiurus nebulosus*), and common carp (*Cyprinus carpio*). Non-gamefish populating the afterbay include hardhead (*Mylopharodon conocephalus*), golden shiner

(*Notemigonus crysoleucas*), hitch (*Lavinia exilicauda*), Sacramento sucker (*Catostomus occidentalis*), sculpin species and wakasagi (*Hypomesus nipponensis*). Smaller numbers of other sport fish are sometimes present in the Lake Oroville complex such as coho salmon which have made their way into the Thermalito Afterbay from Lake Oroville<sup>6</sup>.

### **Methods:**

Angler surveys were conducted based on availability of staff to perform the surveys. For this survey, 12 days (5 weekdays and 7 weekends) were selected in 2012 from February through October. The numbers of days in which the creel census occurred varied from month to month and survey start times were randomly stratified into either AM or PM periods. When anglers had fish in possession and were willing to allow data collection, census takers determined total length (mm) and species. A standard series of questions was asked to determine angling effort, catch rate, and size and species of fish released. In addition, each angler was asked a series of between one and three “yes or no” questions to determine angler satisfaction. Each angler was asked, “Are you satisfied with your angling experience today?” Anglers that caught fish were also asked “Are you satisfied with the size of the fish?” and “Are you satisfied with the number of fish?” Results were compiled to calculate percent of anglers satisfied with these criteria.

The tagging study was conducted using methods described by Guy, et al<sup>8</sup>. Methods consisted of placing Floy<sup>®</sup> T-bar Anchor tags on the steelhead prior to being planted. Printed on each tag was a reward notice of \$10 and the Fish and Game return mailing address. Signs were also placed at several locations around the reservoir to alert anglers about the presence of the tagged fish and how to return the tag for a reward. Upon receipt of the returned tag, anglers were sent a letter confirming the receipt of the tag along with information regarding the tagged fish.

### **Results:**

The surveyed parties combined for a total angling effort of 189.5 hours and 74 fish reported caught (kept or released). This equates to 3.3 hours fished per angler and a catch rate per unit effort (CPUE) of 0.39 fish per hour for the season (Table 2). Table 3 shows a breakdown of catch rates per week from February to October. The primary angling gear was artificial lures at 88% of total anglers (using only one type of gear for that day). Bait was the second most popular response at 7% use and the use of lures and bait during a fishing day accounted for the last 5% of respondents (Figure 1).

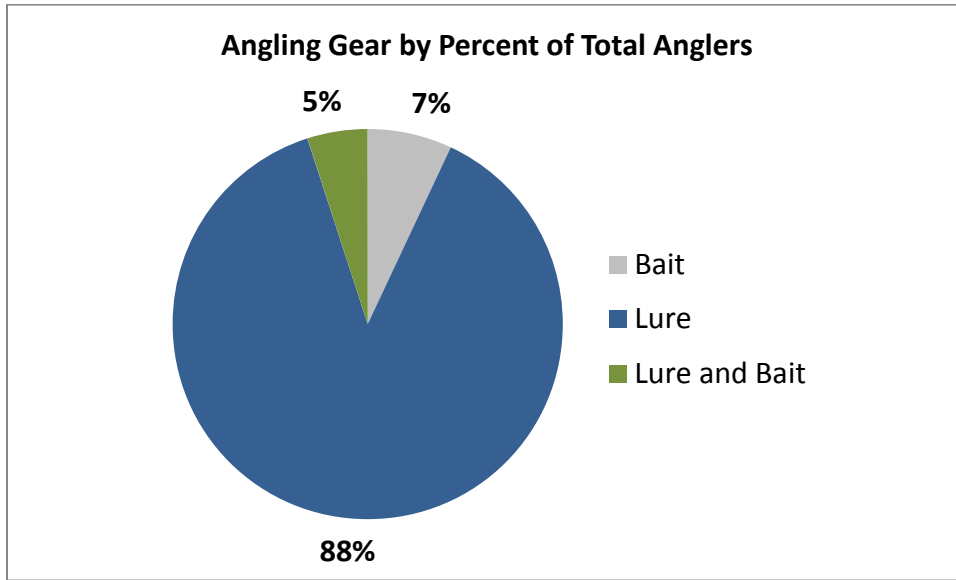
**Table 2. General Catch Statistics for Thermalito Afterbay (2012)**

Total Hours Fished	189.5
Total Number of Anglers	58
Avg. Hours Fished per Angler	3.3
Total Fish Caught	74
<b>Total CPUE</b>	<b>0.39</b>

**Table 3. Catch Statistics for the Thermalito Afterbay from Available Dates (2012)**

<b>Week</b>	<b>Time Fished (Hrs.)</b>	<b>Number of Anglers</b>	<b>Total Fish Caught</b>	<b>Weekly CPUE</b>
<b>Feb 13-19</b>	2.0	1	0	0
<b>Feb 27-Mar 4</b>	0.5	1	0	0
<b>March 5-11</b>	13	5	4	0.3
<b>April 2-8</b>	60	15	30	0.5
<b>April 9-15</b>	34	14	6	0.2
<b>April 16-22</b>	21	4	15	0.7
<b>April 30-May 6</b>	10.5	2	3	0.3
<b>May 21-27</b>	3.0	1	0	0
<b>May 28-June 3</b>	13.5	10	3	0.2
<b>June 4-10</b>	11	3	5	0.5
<b>July 18-24</b>	3.0	1	3	1.0
<b>Oct 1-7</b>	18	4	5	0.3

**Figure 1. Gear Use per Total Anglers at Thermalito Afterbay (2012)**



The survey data for kept and released fish included two species, largemouth bass and steelhead trout. No other species were reported but 58 fish were reported as black bass (genus *Micropterus*), a taxon including largemouth, smallmouth and spotted bass. The most prevalent species indicated were largemouth bass with 12 fish reported caught and a small number of steelhead trout. Although not accounted for in the angler survey data, 14 of the 499 Floy<sup>®</sup> tags attached to 2012 steelhead plants have been returned to the CDFG.

Average sizes were calculated for black bass at 370mm and steelhead trout at 358mm. Catch per hour (CPUE) was similar between black bass and steelhead trout at 0.39 and 0.40 respectively (Table 4).

**Table 4. Catch Statistics per Angler Targeted Species, Thermalito Afterbay (2012)**

Black Bass Kept	2
Black Bass Released	68
Avg. Length Kept	370mm
Black Bass Targeted Hours	179.5
<b>Black Bass Targeted CPUE</b>	<b>0.39</b>
Steelhead Trout Kept	3
Steelhead Trout Released	1
Avg. Length Kept	358mm
Steelhead Trout Targeted Hours	10.0
<b>Steelhead Trout CPUE</b>	<b>0.40</b>

Overall, 73% of anglers surveyed reported that they were satisfied with their fishing experience. For respondents with kept fish, 36% were satisfied with the numbers of fish and 76% were satisfied with the sizes (Table 5). Table six breaks down answers to the survey questions by anglers targeting specific fish which were steelhead trout, black bass and unspecified.

**Table 5. Thermalito Afterbay Percent of Positive Responses to Survey Questions (2012)**

	<b>Yes</b>	<b>No</b>	<b>Percent Satisfied</b>
Overall Fishing Experience	41	15	73%
Satisfaction with Numbers of Fish	9	16	36%
Satisfaction with Fish Size	16	5	76%



**Table 6. Thermalito Afterbay Angler Positive Responses to Survey Questions by Target Species (2012)**

<b>Steelhead Trout</b>	<b>Yes</b>	<b>No</b>	<b>Percent Satisfied</b>
Overall Fishing Experience	<b>6</b>	<b>1</b>	<b>86%</b>
Satisfaction with Numbers of Fish	<b>1</b>	<b>1</b>	<b>50%</b>
Satisfaction with Fish Size	<b>1</b>	<b>1</b>	<b>50%</b>
<b>Black Bass</b>			
Overall Fishing Experience	<b>30</b>	<b>13</b>	<b>70%</b>
Satisfaction with Numbers of Fish	<b>8</b>	<b>14</b>	<b>36%</b>
Satisfaction with Fish Size	<b>14</b>	<b>4</b>	<b>78%</b>
<b>Unspecified Fish</b>			
Overall Fishing Experience	<b>5</b>	<b>1</b>	<b>83%</b>
Satisfaction with Numbers of Fish	<b>0</b>	<b>1</b>	<b>0%</b>
Satisfaction with Fish Size	<b>1</b>	<b>0</b>	<b>100%</b>

## **Discussion:**

Although the sample size of anglers is small, according to the survey the fishing for 2012 on Thermalito Afterbay was fair. The reservoir had a 2012 CPUE of 0.42 fish per hour. The survey showed anglers primarily fished for black bass and overwhelmingly used artificial lures. Although most anglers were not satisfied with the numbers of fish caught, the majority expressed satisfaction with the fish sizes.

The newly implemented annual stocking of steelhead should change the angling situation for the better. Thermalito Afterbay already offers a healthy black bass fishery but increasing numbers of rapidly maturing steelhead will certainly increase catch rates. Large Bass and steelhead, plus ease of access from local towns and cities are combining to make the Thermalito Afterbay an increasingly productive body of water for sport fisherman.

As the steelhead stocking plan moves forward more assessment is needed, mainly through angler surveys. The reservoir can see rapidly changing dynamics depending on flow control at the Oroville dam and downstream agricultural needs. Most affected are water temperatures and reservoir levels. Although the data is lacking from the 2012 survey, future surveys should include water temperature measurements for comparison to catch rates. Returned Floy® tags put on 499 steelhead in 2012, as well as a percentage of stocked trout in the years to follow, will aid in assessment of the steelhead return as the stocking program continues.

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